

## Fiber Characterisation on Some Angiosperms

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### ABSTRACT

*The aim of this research is to determine the anatomical characteristics and strength of the bast fibers of several Dicotyledoneae plants to determine their potential uses and to determine the anatomical structure of the leaves and fiber development of several Monocotyledoneae plants.*

*This research was conducted at the Research and Development Laboratory, Faculty of Mathematics and Natural Sciences, UNY and the Textile Manufacturing and Testing Laboratory, Faculty of Industrial Engineering, UII from March to September 2023. This research is descriptive in nature which leads to the study of the anatomical and mechanical properties of bast fibers of several Dicotyledoneae and leaf fibers of several Monocotyledoneae.*

*The results showed that the average diameter of hibiscus fibers was 11.459  $\mu\text{m}$ , fig 10.876  $\mu\text{m}$ , and god's crown 7.05  $\mu\text{m}$ . The average lumen diameter of hibiscus is 1.85  $\mu\text{m}$ , fig is 2.243  $\mu\text{m}$ , and god's crown is 1.935  $\mu\text{m}$ . The average wall thickness value for hibiscus fibers is 4.804  $\mu\text{m}$ , fig 4.317  $\mu\text{m}$ , and god's crown 2.558  $\mu\text{m}$ . The average length of hibiscus fiber is 3820.578  $\mu\text{m}$ , fig 4617.989  $\mu\text{m}$ , and god's crown 3950.373  $\mu\text{m}$ . The average tensile strength value of hibiscus is 8.74 N, fig is 4.395 N, and god's crown is 5.228 N. The average elongation value of hibiscus fiber is 1.82%, fig is 0.979%, and god's crown is 1, 33%. Bast fiber of hibiscus, fig and god's crown have the potential to be used as raw materials for the paper and composite industries. Based on the results of anatomical observations on sugar cane, bamboo and elephant grass leaves, the fibers observed are xylary fibers because they are in the xylem tissue system, the fibers can be seen and form a blanket that covers the blood vessel bundles. Cylindrical striped fibers that come into contact with the epidermis. Fiber diameter decreases as the second leaf grows and from the third stage of maturity the leaves have a narrow fiber diameter with an interval of 2.00 – 10.00  $\mu\text{m}$ . The lumen diameter of the third plant tends to decrease from old leaves, medium leaves, young leaves. The thickness of the fiber walls of the third plant tends to decrease between old leaves, medium leaves and young leaves.*

Kata Kunci: *Fiber characteristics, fiber anatomy, mechanical properties, Dicotyledoneae, Monocotyledoneae*